with pressure falling below 29.40, heavy gales over the Lake region, the wind reaching 50 miles per hour from the southwest at Chicago, Ill., rain in the southeastern and eastern states, and snow in the north and north-central districts. On this date fresh northerly winds and rain along the middle Atlantic and south New England coasts attended the presence of a low area off the Carolina coast. During the night of the 26–27th the center moved rapidly eastward and the morning of the 27th was central over eastern Maine, with central pressure below 29.30. On this date the greatest decrease in pressure in 12 hours noted for the month, .72, occurred at Eastport, Me.; snow fell in the northern part of the country east of the Rocky Mountains, rain in the middle and south Atlantic states, the Ohio and middle and lower Missouri valleys, and high winds prevailed from the eastern part of the Lake region to the New England coast. By the evening of the 27th the storm-center had disappeared over the Gulf of Saint Lawrence.

XII.—Advanced from the British Northwest Territory, and the morning of the 26th was central over Alberta, with pressure below 29.60. On this date the center advanced slowly southeastward, with a marked rise in temperature along the eastern slope of the Rocky Mountains, the abnormal rise in temperature in 12 hours being 24° at Pueblo, Colo., snow in the Missouri Valley, and high winds on the northeast slope of the Rocky Mountains. From this point the center of disturbance moved rapidly southeastward to the lower Missouri valley by the morning of the 27th, and thence north of east to Maine by the morning of the 28th, its average rate of advance, 54 miles per hour, being the greatest noted in connection with the low areas of the month. Slight changes occurred in central pressure during the passage of the low area. On the 27th the isobar of 29.70 inclosed an elongated area extending from the lower lake region west-southwestward over the Ohio Valley, with high pressure to the northwest and southeast, snow fell in the Lake region and middle Missouri valley, rain in the Ohio and upper Mississippi valleys, and fresh to high winds from the lower Missouri valley over the south part of the Lake region. During the 28th the storm-center disappeared in the direction of Newfoundland. On this date rain fell in the middle and south Atlantic states, snow from the Lake region over New York and New England, the first snow of the season at New York, Philadelphia, and at points in Maryland and Virginia, and fresh to high winds along the New England and middle Atlantic coasts.

On the 29th the first snow of the season fell at stations in Georgia, the Carolinas, and Virginia, attending the presence of a low area off the south Atlantic coast, and high winds exceeding 50 miles per hour occurred on the North Carolina and Virginia coasts. At Norfolk, Va., the depth of snowfall on this date exceeded 6 inches.

XIII.—Apparently advanced from the extreme north Pacific coast, and the evening of the 29th was central over the British Northwest Territory, with pressure 29.40 at Edmonton; and at Prince Albert, N. W. T., the decrease in pressure in 12 hours was .52. Over Manitoba the abnormal rise in temperature in 12 hours exceeded 20°, the wind reached a velocity of 60 miles per hour from the south at Fort Canby, Wash., and rain fell on the north Pacific coast. During the 30th the center moved slowly eastward over the Saskatchewan Valley, with a slight decrease in pressure, and rain fell from the middle and north Pacific coasts over the plateau region north of the 40th parallel.

Tabulated statement showing principal characteristics of areas of high and low pressure.

Barometer.	First observed.			Last observed.		Duration.	Velocity per hour.	Maximum pressure change and maximum abnormal temperature change in twelve hours and maximum wind velocity.								
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.			Station.	Rise.	Date.	Station.	Fall.	Date.	Station.	Direction.	Miles per hour.	Date.
High areas.		°	°	°	°	Days.	Miles.		Inch.								
I	1	48	101	46	65	3.5	25	White River, Ont.	.52	1	Cincinnati, Ohio	20	1	Battleford, N. W. T.	se.	32	1
II	3	41	112	34	105	1.5	17	Montrose, Colo.	.14	3	Tucson, Ariz.	17	5	Cheyenne, Wyo.	ne.	38	3
III	4	51	104	48	65	2.5	34	Prince Albert, N. W. T.	.28	4	Huron, S. Dak.	14	5	Pierre, S. Dak.	e.	20	5
IV	7	44	123	38	112	1.5	19	Rio Grande City, Tex.	.48	9	Abilene, Tex.	29	8	Eureka, Cal.	n.	22	7
V	9	43	126	43	69	6.0	24	Calgary, N. W. T.	.80	10	Miles City, Mont.	33	10	Valentine, Nebr.	w.	42	11
VI	15	53	114	40	71	4.5	27	Rockliffe, Ont.	.66	18	Fort Smith, Ark.	33	16	Bismarck, N. Dak.	nw.	42	16
VII	21	53	115	45	101	1.5	25	Medicine Hat, N. W. T.	.88	21	Pueblo, Colo.	36	21	do	nw.	38	22
VIII	27	47	101	37	81	3.0	22	Pierre, S. Dak.	.64	27	Wilmington, N. C.	37	29	Fort Sill, Okla. T.	n.	36	28
Mean						3.0	24		.55			27				34	
Low areas.									Fall.			Rise.					
I*	1	50	69	50	62	0.5	13	Sydney, C. B. I.	.30	1	Sydney, C. B. I.	7	1	Block Island, R. I.	nw.	36	1
II	2	50	128	48	85	2.5	33	Calgary, N. W. T.	.52	2	Medicine Hat, N. W. T.	24	2	Fort Canby, Wash.	se.	61	2
III	4	52	128	51	94	2.5	25	Prince Albert, N. W. T.	.42	5	Qu'Appelle, N. W. T.	23	4	do	s.	63	4
IV	6	53	113	43	87	1.5	38	Medicine Hat, N. W. T.	.26	6	Winnipeg, Man.	16	7	do	w.	54	6
IVa	6	38	98	47	85	1.5	19	Pueblo, Colo.	.22	5	Kansas City, Mo.	20	6	Cheyenne, Wyo.	w.	44	7
V	8	32	100	48	83	3.0	22	Alpena, Mich.	.40	10	Knoxville, Tenn.	18	9	Corpus Christi, Tex.	nw.	48	9
VI	9	52	112	49	64	3.5	29	Calgary, N. W. T.	.34	8	Pueblo, Colo.	22	10	Fort Assinaboine, Mont.	nw.	60	10
VII	15	49	98	50	63	3.0	25	Marquette, Mich.	.70	15	Chatham, N. B.	21	16	Buffalo, N. Y.	sw.	54	17
VIII	17	52	117	49	87	2.0	29	Medicine Hat, N. W. T.	.54	17	Fort Assinaboine, Mont.	27	18	Chicago, Ill.	s.	51	19
IX	20	52	110	48	86	1.5	36	Green Bay, Wis.	.52	21	Prince Arthur, Ont.	27	21	Fort Canby, Wash.	w.	50	20
														Denver, Colo.	nw.	50	21
IXa	20	37	103	48	86	1.5	36	Leavenworth, Kans.	.34	20	Fort Stanton, N. Mex.	16	19	Chicago, Ill.	sw.	48	21
														Detroit, Mich.	sw.	48	21
X	21	35	98	50	68	3.0	27	Albany, N. Y.	.54	23	Palestine, Tex.	16	21	Buffalo, N. Y.	sw.	66	24
XI	24	53	113	45	68	2.5	38	Eastport, Me.	.72	27	Bismarck, N. Dak.	24	25	Chicago, Ill.	sw.	50	26
XII	26	51	113	45	69	2.0	54	Qu'Appelle, N. W. T.	.44	26	Pueblo, Colo.	24	26	Fort Assinaboine, Mont.	w.	48	26
XIII	29	54	114	54	104	1.0	18	Prince Albert, N. W. T.	.52	30	Minnedosa, Man.	21	29	Fort Canby, Wash.	s.	60	29
Mean						2.1	29		.45			20				53	

*Continuation of low area X for October, 1891.

NORTH ATLANTIC STORMS FOR NOVEMBER, 1891 (pressure in inches and millimeters; wind-force by Beaufort scale).

The paths of storms that appeared over the west part of the north Atlantic Ocean during November, 1891, are shown on Chart I. These paths have been determined from observations by shipmasters received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

In November there is usually a decrease in mean pressure over the eastern part of the north Atlantic Ocean, the increase being most marked north of the British Isles, where the Iceland winter area of low pressure is forming. A decrease in pressure is also shown from this region westward to the Canadian Maritime Provinces. The region of greatest storm

frequency in November lies along a line traced from Newfoundland to north of the British Isles; the storms move with an average velocity of about 21 miles per hour; and an average of 2 storms traverse the ocean from the American to the European coasts.

The storms of the current month generally followed a normal path; they developed great energy over the eastern part of the ocean, and at least two storms appeared to traverse the ocean from coast to coast.

The month opened with a storm of marked energy central north-northwest of the Azores; the pressure fell to about 29.00 (737) at the center of disturbance, and whole gales were experienced along the trans-Atlantic steamship tracks between the 15th and 40th meridians. By the 2d the disturbance had changed position slightly to the eastward, and the morning of the 3d was central northeast of the Azores, in which position a marked loss of energy was shown. On the 4th the storm was located off the coast of Portugal, after which it disappeared east of the region of observation. The abnormal course of this storm was apparently due to high pressure northeast of its position. During the 1st a storm of considerable strength (low area I) advanced eastward over the north part of the Gulf of Saint Lawrence, whence it moved to Labrador by the 2d, and passing thence over mid-ocean in high latitudes disappeared in the direction of Iceland after the 4th. On the 3d an ill-defined cyclonic area was indicated over the Caribbean Sea south of Cuba. The morning of the 4th a storm was located south of Bermuda. Moving northeastward the disturbance reached the 34th parallel by the 5th, and the morning of the 6th was central on the northeast edge of the Banks of Newfoundland, with a decided increase of energy, and strong to whole gales between the 40th and 50th meridians. Moving thence east-northeast the center occupied a position northwest of the British Isles on the 8th. The pressure continued low north and west of the British Isles until the 10th, on which date gales of hurricane force and pressure below 29.00 (737) were reported east of the 20th meridian.

During the 11th a storm of great energy passed eastward over the British Isles, and during that and the preceding date immense damage was caused to property and shipping and many lives were lost along the coasts of Great Britain. At London, England, the barometer fell to 28.50 (724). The storm was also very severe along the French and Spanish coasts. On the 6th a cyclonic area which had apparently advanced from the southward was central about midway between Bermuda and the North Carolina coast, whence it moved east-northeast and the morning of the 9th was located east of the Banks of Newfoundland. It is not improbable that this storm passed rapidly north of east and united with the storm which visited the British Isles with such destructive violence during the 10th and 11th. On the 12th a storm-center appeared west-southwest of Ireland, where pressure falling to about 28.40 (721), and gales reaching force 10 to 12 were reported. This storm remained almost stationary until the 13th, without an apparent loss of energy, and on the 14th was central south of Ireland, after which it disappeared beyond the region of observation. On the 13th a storm (low areas V and VI) was central over the Gulf of Saint Lawrence. The morning of the 14th this storm was central north of the Grand Banks, whence it advanced to mid-ocean by the 15th, and disappeared north of the British Isles by the 17th. On the 17th a storm which had apparently developed over mid-ocean in the wake of the storm last referred to appeared near the 30th meridian, whence it moved northeastward with evidence of marked energy and disappeared beyond the region of observation after the 19th. On the 18th a storm (low area VII) moved northeastward over Labrador.

On the 21st a cyclonic area was indicated north of the Windward Islands, whence it moved northward without evidence of marked energy and apparently united with low area X over the Gulf of Saint Lawrence after the 24th. From the 22d to the close of the month the pressure continued low over the British Isles, and on the 28th the readings were 29.10 (739) in Ireland. During the 25th a storm (low area X) passed northeastward over Labrador, and thence north of the region of observation. On the 27th a storm, which was probably a continuation of low area X, was central over mid-ocean in high latitudes, and by the 28th this storm-center had advanced near the Irish coast, after which it apparently moved northward. During the 27th a storm (low area XI) moved northeastward over the Gulf of Saint Lawrence, and the morning of the 28th was central north of the Banks of Newfoundland, whence it passed east-northeast to mid-ocean, where the pressure continued low until the close of the month. During the 28th a storm (low area XII) moved over the south part of the Gulf of Saint Lawrence, and on the 29th was central north of the Grand Banks, whence it advanced to mid-ocean by the close of the month. Reports of the 29th and 30th indicated the presence off the North Carolina and Virginia coasts of a storm of limited energy.

OCEAN ICE.

The only Arctic reported for November, 1891, was an iceberg in N. 51° 53′, W. 55° 35′, on the 8th. In November, 1890, a small piece of ice was observed in N. 46° 35′, W. 47° 51′. In 1882, 1883, 1887, and 1888 no Arctic ice was reported near Newfoundland and the Grand Banks. In 1884 several icebergs were seen in N. 45° 56′, W. 52° 38′. In 1885 the only iceberg reported was observed in N. 48° 00′, W. 51° 10′. In 1886 one iceberg was reported in N. 45° 20′, W. 45° 26′.

OCEAN FOG.

The limits of fog belts west of the 40th meridian, as reported by shipmasters, are shown on Chart I by dotted shading. Near the Banks of Newfoundland fog was reported on 8 dates; between the 55th and 65th meridians on 3 dates; and west of the 65th meridian on 2 dates. Compared with the corresponding month of the last 4 years the dates of occurrence of fog east of the 55th meridian number 3 less than the average; between the 55th and 65th meridians the number of days of fog corresponded with the average; and west of the 65th meridian the dates of fog numbered 4 less than the average. The fog reported by shipmasters and noted at stations of the Weather Bureau along the New England and New York coasts generally attended the advance or passage of general storms.

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

Many of the voluntary stations do not have standard thermometers or shelters.

The distribution of mean temperature over the United States and Canada for November, 1891, is exhibited on Chart II by dotted isotherms. In the table of miscellaneous meteorological data the monthly mean temperature and the departure from the normal are given for regular stations of the Weather Bureau. The figures opposite the names of the geographical districts in the columns for mean temperature and departure from the normal show, respectively, the average for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Weather Bureau represents the mean of the maximum and minimum temperatures.

The mean temperature was highest over extreme southern Florida, where it rose above 70; a monthly mean of 72 was